

SYSTEMS AND METHODS TO FACILITATE ANALYSIS OF A COMMERCIAL MORTGAGE BACKED SECURITY PORTFOLIO VIA A COMMUNICATION NETWORK

CROSS-REFERENCE TO RELATED APPLICATIONS

The present invention is a continuation-in-part of U.S. Patent Application Serial No. __/__,__ entitled "Systems and Methods to Facilitate Analysis of a Commercial Mortgage Backed Security Portfolio Based on a Contribution of an Additional Mortgage Loan" filed on November 29, 2001. The entire contents of that application are incorporated herein by reference.

FIELD

The present invention relates to commercial mortgage backed security portfolios. In particular, the present invention relates to systems and methods to facilitate analysis of a commercial mortgage backed security portfolio via a communication network.

BACKGROUND

A Commercial Mortgage Backed Security (CMBS) is a bond or other financial obligation associated with a pool or "portfolio" of mortgage loans secured by commercial assets (e.g., a hotel or office building). A CMBS portfolio is typically divided into a number of different credit rating categories, with certain categories being, by design, less likely to suffer defaults (e.g., a CMBS portfolio may have a less risky "AAA" category and a more risky "AA" category). Each of these credit rating categories is associated with a category size. For example, a CMBS portfolio may have a "AAA" credit rating category with a size of 75% (i.e., 75% of the total portfolio assets are in the "AAA" category), a "AA" category with a size of 15%, and a "A" category with a size of 10%.

Note that different credit rating categories may be associated with a different loan “spreads” representing the difference between an interest rate paid to investors and an known index (e.g., a number of basis points between the interest rate paid to investors and the rate currently associated with, for example, a ten year US treasury note). A less risky credit rating category will generally have a lower loan spread while a more risky category will have a higher loan spread.

Each loan in the CMBS portfolio is also associated with a loan spread, with a higher loan spread indicating a higher profitability of the loan. When creating a CMBS portfolio, the value or profitability of a loan that might be added to the portfolio is often of interest (e.g., to parties that are negotiating an addition of a mortgage loan to a CMBS portfolio). That is, the loan spread that will be required to produce a desired level of profitability may need to be calculated and distributed to interested parties. Because CMBS portfolios can be associated with a significant amount of capital (e.g., \$800 MM), an accurate determination and timely distribution of this information is important.

This type of calculation, however, can be very complex (e.g., because different loans that might be added to a CMBS portfolio may effect the overall credit rating category sizes in different ways) and time consuming.

Unfortunately, the calculation may need to be performed frequently (e.g., on a daily basis) because some of the variables that effect the relationship between the loan spread and the profitability of the loan constantly change (e.g., treasury rates, investor opinions, and competition in the CMBS market). Moreover, the calculation may need to be performed for a significant number of different property types (e.g., associated with different commercial assets securing additional loans) and risk parameters (e.g., debt service coverage ratio information and loan to value information). All of these factors can make the accurate and timely distribution of appropriate loan spread information difficult.

SUMMARY

To alleviate problems inherent in the prior art, the present invention introduces systems and methods to facilitate analysis of a CMBS portfolio via a communication network.

5 According to one embodiment, base information is determined associated with a CMBS portfolio having a plurality of mortgage loans. Information associated with an additional mortgage loan to be added to the portfolio is also determined, including at least one desired profitability value for the additional mortgage loan. At least one loan spread value associated with the additional mortgage loan is then transmitted to a user terminal via a communication network.

10 According to another embodiment, base information is retrieved associated with a CMBS portfolio having a plurality of mortgage loans and a plurality of credit rating categories (each credit rating category being associated with a current category size). Information associated with an additional mortgage loan to be added to the portfolio is also received, including a desired profitability of the additional mortgage loan. For the additional mortgage loan, a category size for each rating category is determined based on at least one of: (i) a property type, (ii) a risk value, (iii) debt service coverage ratio information, and (iv) loan to value information. The category size for the additional mortgage loan is added to the current category size to determine a combined category size for each rating category. An original profitability of the portfolio is determined, and a combined profitability of the portfolio and the additional mortgage loan is calculated based on the combined category sizes. The original profitability is subtracted from the combined profitability to determine a profitability of the additional mortgage loan, and a calculated loan spread for the additional mortgage loan is transmitted to a user terminal via a Web site. The loan spread is calculated in accordance with a contribution of the additional mortgage loan to the portfolio, wherein the calculation of the loan spread is an iterative process, comprising: determining a trial loan spread for the additional mortgage loan,

computing a resulting profitability based on the trial spread, and adjusting the trial loan spread based on a duration of the additional mortgage loan, wherein said computing and adjusting are repeated until the resulting profitability is within a predetermined range of the desired profitability.

5 One embodiment comprises: means for determining base information associated with a CMBS portfolio having with a plurality of mortgage loans; means for determining information associated with an additional mortgage loan to be added to the portfolio, including at least one desired profitability value for the additional mortgage loan; and means for transmitting to a user
10 terminal at least one loan spread value associated with the additional mortgage loan via a communication network.

Another embodiment comprises: means for retrieving base information associated with a CMBS portfolio having a plurality of mortgage loans and a plurality of credit rating categories (each credit rating category being
15 associated with a current category size; means for receiving information associated with an additional mortgage loan to be added to the portfolio, including a desired profitability of the additional mortgage loan; means for determining, for the additional mortgage loan, a category size for each rating category based on at least one of: (i) a property type, (ii) a risk value, (iii) debt
20 service coverage ratio information, and (iv) loan to value information; means for adding the category size for the additional mortgage loan to the current category size to determine a combined category size for each rating category; means for determining an original profitability of the portfolio; means for calculating a combined profitability of the portfolio and the additional mortgage
25 loan based on the combined category sizes; means for subtracting the original profitability from the combined profitability to determine a profitability of the additional mortgage loan; and means for transmitting to a user terminal via a Web site a calculated loan spread for the additional mortgage loan in accordance with a contribution of the additional mortgage loan to the portfolio,
30 wherein the calculation of the loan spread is an iterative process, comprising: determining a trial loan spread for the additional mortgage loan, computing a

resulting profitability based on the trial spread, and adjusting the trial loan spread based on a duration of the additional mortgage loan, wherein said computing and adjusting are repeated until the resulting profitability is within a predetermined range of the desired profitability.

5 With these and other advantages and features of the invention that will become hereinafter apparent, the invention may be more clearly understood by reference to the following detailed description of the invention, the appended claims, and the drawings attached herein.

10 **BRIEF DESCRIPTION OF THE DRAWINGS**

FIG. 1 is a block diagram of a portfolio analysis system according to some embodiments of the present invention.

FIG. 2 is an information flow diagram according to some embodiments of the present invention.

15 FIG. 3 is a flow chart of a method according to some embodiments of the present invention.

FIG. 4 illustrates an input display according to an embodiment of the present invention.

20 FIG. 5 illustrates an output display according to an embodiment of the present invention.

FIGS. 6 and 7 are a flow chart of a method according to another embodiment of the present invention.

FIG. 8 is a flow chart of an iterative process according to one embodiment of the present invention.

25 FIG. 9 is a block diagram overview of a real time pricing server according to an embodiment of the present invention.

FIG. 10 is a tabular representation of a portion of a portfolio database according to an embodiment of the present invention.

FIG. 11 is a tabular representation of a portion of a market information database according to an embodiment of the present invention.

FIG. 12 is a tabular representation of a portion of a contributory bond sizes database according to an embodiment of the present invention.

5 FIG. 13 is an information flow diagram according to another embodiment of the present invention.

FIG. 14 is a flow chart of a method according to the embodiment illustrated in FIGS. 13.

10 DETAILED DESCRIPTION

Embodiments of the present invention are directed to systems and methods to facilitate analysis of a CMBS portfolio via a communication network.

15 Portfolio Analysis System

Turning now in detail to the drawings, FIG. 1 is a block diagram of a portfolio analysis system 100 according to some embodiments of the present invention. The portfolio analysis system 100 includes a real time pricing server 900 in communication with a user terminal 10 through a
20 communication network 20. The communication network 20 may comprise, for example, a Local Area Network (LAN), a Metropolitan Area Network (MAN), a Wide Area Network (WAN), a proprietary network, a Public Switched Telephone Network (PSTN), a Wireless Application Protocol (WAP) network, or an Internet Protocol (IP) network such as the Internet, an intranet or an
25 extranet.

The real time pricing server 900 and the user terminal 10 may be any devices capable of performing the various functions described herein. The real time pricing server 900 may be, for example, a Web server adapted to perform calculations and provide results in a substantially real-time fashion.

The user terminal 10 may be, for example, a Personal Computer (PC) adapted to run a Web browser application (e.g., the INTERNET EXPLORER® application available from MICROSOFT®), a portable computing device such as a laptop computer or a Personal Digital Assistant (PDA), and/or a wireless telephone.

Note that the devices shown in FIG. 1 need not be in constant communication. For example, the real time pricing server 900 may communicate with the user terminal 10 on an as-needed or periodic basis. Moreover, although a single real time pricing server 900 and user terminal 10 are shown in FIG. 1, any number of these devices may be included in the portfolio analysis system 100. For example, one user terminal 10 may transmit information to the real time pricing server 900 while another user terminal 10 receives information from the real time pricing server 900.

According an embodiment of the present invention, the real time pricing server 900 facilitates analysis of a CMBS portfolio. In particular, FIG. 2 is an information flow diagram according to some embodiments of the present invention. As can be seen, the real time pricing server 900 may receive base portfolio information along with information associated with an additional mortgage loan to be added to the portfolio. The real time pricing server 900 then provides a loan spread for the additional mortgage loan in accordance with a contribution of the additional mortgage loan to the portfolio. Moreover, the real time pricing server 900 may calculate and provide loan profitability information which, in turn, may be used by the real time pricing server 900 (e.g., in an iterative fashion).

Portfolio Analysis Methods

FIG. 3 is a flow chart of a method that may be performed by the real time pricing server 900 according to some embodiments of the present invention. The flow charts in FIG. 3 and the other figures described herein do

not imply a fixed order to the steps, and embodiments of the present invention can be practiced in any order that is practicable.

At 302, base information associated with a portfolio is determined. The base information may include, for example: balance information, loan rate
5 information, loan term information, remaining term information, amortization term information, servicing fee information, payment basis information, payment basis servicing fee information, and/or a calculation of interest reserve information. Note that the real time pricing server 900 may
10 "determine" the base information by receiving the information from another source. For example, according to one embodiment, the real time pricing server 900 retrieves the base information from a database or an associated system. Some of the base information may also be generated in accordance with a function library adapted to generate loan and/or CMBS cash flows, such as the TREPPENGINE™ set of C-function library subroutines available
15 from TREPP LLC.

At 304, information associated with an additional mortgage loan to be added to the portfolio is determined, including at least one desired profitability value. According to one embodiment, the real time pricing server 900
20 receives at least some information associated with the additional mortgage loan from the user terminal 10 via the input display 400 illustrated in FIG. 4. As can be seen in FIG. 4, such information may include, for example, treasury information (e.g., interest rates), swap information, and London Inter Bank Offer Rate (LIBOR) information.

Note that the additional mortgage loan may be associated with a
25 plurality of credit rating categories (e.g., AAA, AA, and A), and each credit rating category may be associated with a loan spread (e.g., a basis points value). For example, as shown in FIG. 4, the user has indicated that the additional loan's "AA" credit rating category will have a spread of "171.4"

Each credit rating category is also associated with a category "size"
30 (e.g., expressed as a percentage of the total loan). Note that the values illustrated in FIG. 4 are for illustration purposes only (e.g., the sum of the

category sizes may equal “100” in an actual input display 400). According to one embodiment, the real time pricing server 900 determines category sizes for the additional mortgage loan based on a property type (e.g., a “hotel” or an “industrial” property type) and/or a risk value associated with the loan (e.g., debt service coverage ratio information or loan to value information). For example, the real time pricing server 900 may retrieve appropriate category sizes from a contributory bond sizes database (described with respect to FIG. 12) in accordance with a rating agency model.

Other information may also be provided via the input display 400, including, for example, price cap information and coupon information for each credit rating category. Similarly, a user may indicated whether or not a particular credit rating category will be calculated.

At 306, information is transmitted to a user terminal 10 via a communication network. In particular, at least one loan spread value associated with an additional mortgage loan is transmitted, enabling users to receive timely and accurate loan spread information. For example, the real time pricing server 900 may calculate loan spread values in accordance with a contribution of the additional mortgage loan to the portfolio. According to one embodiment, the real time pricing server 900 initially determines an original profitability of the portfolio based on the portfolio’s current credit rating category sizes (e.g., without the additional loan).

The real time pricing server 900 may then add the category size associated with the additional mortgage loan to the current category size to determine a combined category size for each credit rating category. For example, Table I illustrates current category sizes, additional loan category sizes and combined category sizes for a portfolio having a base collateral of \$800 MM and an additional multi-family property type loan having a debt service coverage ratio of 1.2 and a size of \$6.5 MM.

Table I. Illustration of Combined Category Sizes

Credit Rating Category	Current Category Size	Additional Loan Category Sizes	Combined Category Sizes
AAA-L	76.125	74.14	76.1091
AA	4.750	5.12	4.7530
A	4.00	4.54	4.0044
A-	1.375	1.32	1.3746
BBB	3.125	3.23	3.1258
BBB-	1.000	1.28	1.0023
BB+	3.875	1.83	3.8585
BB	0.750	2.51	0.7642
BB-	0.750	1.00	0.7520
B+	0.375	1.04	0.3803
B	0.625	1.03	0.6283
B-	0.650	0.66	0.6500
NR	2.600	2.29	2.5975

5 A combined profitability of the portfolio and the additional mortgage loan is then calculated based on the combined category sizes, and the real time pricing server 900 subtracts the original profitability from the combined profitability to determine a profitability of the additional mortgage loan as illustrated in Table II.

Table II. Illustration of Profitability Calculation

	Original Portfolio	Original Portfolio Plus Additional Loan	Additional Loan
Flat Proceeds	\$820,000,000	\$826,565,000	\$6,565,000
Collateral	\$800,000,000	\$806,500,000	\$6,500,000
Net	20,000,000	20,065,000	65,000
	2.50%	2.49%	1.00%

- 10 Note that this calculation may be performed for a number of different original term periods (e.g., 5, 7, and 10 year original term periods).

According to one embodiment, the information associated with the additional mortgage loan includes one or more desired profitability values (or

“arbitrage targets”) of the additional mortgage loan. For example, the real time pricing server 900 may determine loan spreads for the additional mortgage loan based on desired profitability values of 0.75%, 1.00%, and 1.25%.

Note that the calculation of the loan spread may be an iterative process. For example, the real time pricing server 900 may determine a “trial” loan spread for the additional mortgage loan. A resulting profitability may then be calculated for the additional loan based on this trial loan spread. If the profitability is within a predetermined range of the desired profitability, the process ends. That is, the real time pricing server 900 has found the appropriate loan spread (e.g., the trial loan spread) that will result in the desired profitability for the additional mortgage loan.

If, however, the profitability calculated based on the trial loan spread is not within a predetermined range of the desired profitability, the real time pricing server 900 may adjust the trial loan spread and repeat the profitability calculation (i.e., using the adjusted loan spread). This process may be repeated until the resulting profitability is within the predetermined range of the desired profitability.

According to one embodiment, the real time pricing server 900 adjusts the trial loan spread based on a duration of the additional mortgage loan. For example, an original duration of the portfolio may be determined (e.g., without the additional mortgage loan) and a combined duration of the portfolio and the additional mortgage loan may be calculated. The real time pricing server 900 may then subtract the original duration from the combined duration to determine the duration of the additional mortgage loan as illustrated in Table III.

Table III. Illustration of Duration Calculation			
	Original Portfolio	Original Portfolio Plus Additional Loan	Additional Loan
Collateral	\$800,000,000	\$806,500,000	\$6,500,000
Duration	6.461	6.460	6.34

In this case, the duration of the additional mortgage loan may be used to estimate an adjustment to the trial loan spread. For example, if the duration of the additional mortgage loan is 6.34, the basis points change per percentage point would be 15.78 (i.e., taking the reciprocal of the duration).

As result of the iterative process described above, the real time pricing server 900 may generate individual loan pricing outputs expressed as spread values in accordance with profitability targets. According to another embodiment, a single profitability target is used and various loan spread values are calculated (and transmitted) for a number of different property types. For example, FIG. 5 illustrates an output display 500 according to an embodiment of the present invention. In particular, the output display 500 is a matrix of loan spread values associated with a profitability of 1.00%. The loan spread values are also associated with a number of different property types, Debt Service Coverage Ratios (DSCRs), Loan To Values (LTVs), and loan term periods. As can be seen, if a profitability of 1.00% is desired, the loan spread for an additional multifamily mortgage loan having a DSCR of 1.32, an LTV of 74%, and a 7 year term should be "198." As a result, the output display 500 may be of interest to parties considering a number of different mortgage loans that might be added to the portfolio.

FIGS. 6 and 7 are a flow chart of a method according to another embodiment of the present invention. In particular, the flow chart illustrates a computer-implemented method to facilitate analysis of a CMBS portfolio associated with a plurality of mortgage loans. The method may be performed, for example, by the real time pricing server 900 and/or a user terminal 10.

At 602, base information associated with the portfolio is determined. For example, the real time pricing server 900 may determine balance information, loan rate information, original term information (e.g., 60, 84, or 120 months), remaining term information, amortization term information (e.g., 300 or 360 months), servicing fee information (e.g., .075), payment basis information, payment basis servicing fee information, and/or a calculation of

interest reserve information. The real time pricing server 900 may determine this information via, for example, a database, an associated system, and/or a function library (e.g., the TREPPENGINE™). The base information may also include the current sizes of a number of different credit rating categories.

5 At 604, information associated with an additional mortgage loan to be added to the portfolio is determined. For example, the real time pricing server 900 may receive some or all of the following information from the user terminal 10: treasury information (e.g., interest rates), swap information, and London Inter Bank Offer Rate (LIBOR) information. According to this
10 embodiment, the information associated with the additional loan includes at least one desired profitability of the additional mortgage loan (e.g., an arbitrage target expressed as a percent of balance).

15 The additional mortgage loan is associated with a plurality of credit rating categories (e.g., AAA, AA, and A), and each credit rating category may be associated with a loan spread (e.g., a basis points value). Other information may also be determined on a credit rating category basis, such as price cap information, coupon information, and/or an indication of whether or not a particular credit rating category will be calculated.

20 Each credit rating category is also associated with a category “size” (e.g., expressed as a percentage of the total loan). At 606, the real time pricing server 900 determines category sizes for the additional mortgage loan based on a property type (e.g., a “hotel” or an “industrial” property type) and/or a risk value associated with the loan (e.g., debt service coverage ratio information and/or loan to value information). For example, the real time
25 pricing server 900 may retrieve appropriate category sizes from a contributory bond sizes database (described with respect to FIG. 12).

30 At 608, the real time pricing server 900 adds the category size for the additional mortgage loan to the current category size and/or term to determine a combined category size for each rating category. Note that when the current category size is expressed as a percentage value of the original portfolio and the additional loan category size is expressed as a percentage

value of the additional loan, the relative sizes of the portfolio and the additional loan is needed to calculate the combined category sizes (e.g., the contribution of the additional loan is weighted).

Referring now to FIG. 7, an original profitability of the portfolio is determined at 702. That is, the real time pricing server 900 determines the profitability of the original portfolio without considering the additional mortgage loan.

At 704, the combined profitability of the portfolio and the additional mortgage loan is determined by the real time pricing server 900 in accordance with the combined category sizes. Thus, the profitability of the additional mortgage loan may be determined at 706 via a method of subtraction process. That is, the original profitability may be subtracted from the combined profitability to determine a profitability of the additional mortgage loan.

At 708, the real time pricing server 900 calculates a loan spread for the additional mortgage loan in accordance with a contribution of the additional mortgage loan to the portfolio, wherein the calculation of the loan spread is an iterative process. This iterative process will now be described with respect to FIG. 8. Note that the iterative process may be performed for a number of desired profitability values (e.g., 1%, 2%, and 3%).

At 802, a trial loan spread for the additional mortgage loan is determined. A resulting profitability of the additional loan is then computed by the real time pricing server 900 based on the trial spread at 804.

If the resulting profitability is within a predetermined range of the desired profitability for additional loan at 806, the trial loan spread is stored and output to a user at 808 (e.g., by transmitting information to a user terminal 10 via a Web site).

If the resulting profitability is not within the predetermined range (i.e., a tolerance associated with the profitability calculation) of the desired profitability at 806, the trial loan spread is adjusted at 810 and the process

continues at 804. For example, the real time pricing server 900 may adjust the trial loan spread based on a duration of the additional mortgage loan and a version of Newton's method until the resulting profitability converges with the desired profitability.

- 5 In this case, the duration of the additional loan may be calculated and a basis points change per percentage point (i.e., based on the reciprocal of the duration of the additional loan) may be used to determine a tolerance (i.e., the predetermined range in step 806) and/or an estimated adjustment to the trial loan spread. According to one embodiment, the following formula is used to
- 10 compute the adjusted trial loan spread:

$$\frac{\Delta P}{P} = -D\Delta Y$$

Or, rearranged:

$$\frac{\Delta P}{P} \times \frac{1}{-D} = \Delta Y$$

- 15 Where " $\Delta P/P$ " equals (the trial proceeds – the target proceeds)/(collateral balance), " D " is the duration of the additional loan (e.g., as computed by a function library), and " ΔY " is the change in the trial loan spread.

- 20 For example, if the trial spread is 511,090, then trial proceeds of 827,303,862 and target proceeds of 826,565,000 may be determined. The resulting difference (i.e., " ΔP ") would then be 738,862. Given a collateral balance of 806,500,000 (i.e., representing the original portfolio plus the additional mortgage loan) then " $\Delta P/P$ " would equal 0.0916%. As described above, the duration of the additional loan was 6.34. Thus, " ΔY " may be computed to be –0.0145% and the trial spread must be reduced to increase
- 25 proceeds.

For increased tolerances (i.e., a smaller predetermined range in step 806), more sophisticated approaches may be required to reach the desired profitability values. In addition, the Secant method (e.g., using the initial

spread and the trial spread to refine the next estimated spread) may be used to converge even with a significant amount of negative convexity (e.g., price capped bonds). Similarly, any root finding method for a non-linear equation may be used in accordance with the present invention.

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Real Time Pricing Server

FIG. 9 illustrates a real time pricing server 900 that is descriptive of the device shown, for example, in FIG. 1 according to some embodiments of the present invention. The real time pricing server 900 includes a processor 910, such as one or more INTEL® Pentium® processors. The processor 910 communicates with other devices, such as one or more user terminals 10, via a communication device 920.

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The processor 910 is also in communication with a storage device 930. The storage device 930 may comprise any appropriate information storage device, including combinations of magnetic storage devices (e.g., magnetic tape and hard disk drives), optical storage devices, and/or semiconductor memory devices such as Random Access Memory (RAM) devices and Read Only Memory (ROM) devices.

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The storage device 930 stores a program 915 for controlling the processor 910. The processor 910 performs instructions of the program 915, and thereby operates in accordance with the present invention. For example, the processor 910 may determine base information associated with a CMBS portfolio having a plurality of mortgage loans. The processor 910 may also determine information associated with an additional mortgage loan to be added to the portfolio, including at least one desired profitability value for the additional mortgage loan. The processor 910 then transmits to a user terminal 10 at least one loan spread value associated with the additional mortgage loan via a communication network 20.

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As shown in FIG. 9, the storage device 930 also stores a portfolio database 1000 (described with respect to FIG. 10), a market information

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database 1100 (described with respect to FIG. 11), and a contributory bond sizes database 1200 (described with respect to FIG. 12). Examples of databases that may be used in connection with the real time pricing server 900 will now be described in detail. The illustrations and accompanying descriptions of the databases presented herein are exemplary, and any number of other database arrangements could be employed besides those suggested by the figures.

Portfolio Database

Referring to FIG. 10, a table represents the portfolio database 1000 that may be stored at the real time pricing server 900 according to an embodiment of the present invention. The table includes entries identifying commercial mortgage loans associated with a CMBS portfolio. The table also defines fields 1002, 1004 for each of the entries. The fields specify: a mortgage loan identifier 1002 and a mortgage loan status 1004.

The mortgage loan identifier 1002 may be, for example, an alphanumeric code associated with a particular commercial mortgage loan. The mortgage loan status 1004 indicates whether the loan is part of an "existing" portfolio (i.e., is already in a pipeline to be bundled into a CMBS portfolio) or is an "additional" loan to be added to the portfolio.

Market Information Database

Referring to FIG. 11, a table represents the market information database 1100 that may be stored at the real time pricing server 900 according to an embodiment of the present invention. The table includes entries identifying information associated with an additional mortgage loan to be added to a CMBS portfolio. The table also defines fields 1102, 1104, 1106 for each of the entries. The fields specify: a market information identifier 1102, a market information description 1104, and market information 1106. The information in the market information database 1100 may be created and

updated, for example, based on information received from a user terminal 10 (e.g., via the input display 400 described with respect to FIG. 4).

The market information identifier 1102 may be, for example, an alphanumeric code associated with a particular item of information and may be based on the mortgage loan identifier 1002 of the additional mortgage loan. The market information description 1104 describes the item and the market information 1106 provides one or more values for the item. For example, as illustrated by the four entry in FIG. 11, the current LIBOR rates associated with the additional mortgage loan are 6.18% (one month) and 6.28% (three months).

Contributory Bond Sizes Database

Referring to FIG. 12, a table represents the contributory bond sizes database 1200 that may be stored at the real time pricing server 900 according to an embodiment of the present invention. The table includes entries identifying property types that may be associated with a commercial mortgage loan. The table also defines fields 1202, 1204, 1206, 1208 for each of the entries. The fields specify: a property type 1202, a DSCR 1204, terms to computer 1206, and credit rating categories and sizes 1208. The information in the contributory bond sizes database 1200 may be created and updated, for example, based on bonds that could currently be sold in the capital market (e.g., an estimate of how an individual loan having certain characteristics would be rated).

The property type 1202 indicates the type of property associated with a loan (e.g., an “anchored retail” or an “industrial” property). For each type of property, credit rating categories and sizes 1208 are defined for various DSCR 1204 (e.g., ranges of DSCR values). Note that the values illustrated in FIG. 12 are for illustration purposes only (e.g., the sum of the category sizes for a given property type 1202 may equal “100” in an actual contributory bond sizes database 1200). According to some embodiments, other types of risk

parameters may be stored in the contributory bond sizes database instead of, or in addition to, the DSCR 1204 (e.g., loan to value information). The terms to compute 1206 may indicate, for example, that a particular property type is associated with a 5, 7, and 10 year term and a 30 year amortization.

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Additional Embodiments

The following illustrates various additional embodiments of the present invention. These do not constitute a definition of all possible embodiments, and those skilled in the art will understand that the present invention is applicable to many other embodiments. Further, although the following embodiments are briefly described for clarity, those skilled in the art will understand how to make any changes, if necessary, to the above-described apparatus and methods to accommodate these and other embodiments and applications.

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Although the output display 500 illustrated in FIG. 5 provides loan spread values for a desired profitability target, other types of output displays may be provided as well. For example, an output display may be associated with a number of different profitability targets (e.g., 0.75%, 1.00%, and 1.25%%).

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Embodiments of the present invention have been described with respect to the calculation of a loan spread based on a desired profitability associated with an additional mortgage loan. FIG. 13 is an information flow diagram according to another embodiment of the present invention. In this case, the real time pricing server 900 instead calculates the profitability of the additional mortgage loan in accordance with base information and a desired loan spread

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FIG. 14 is a flow chart of a method according to the embodiment illustrated in FIGS. 13. As before, base information associated with the portfolio is determined at 1402 and information associated with an additional mortgage loan to be added to the portfolio is determined at 1404 (including a

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desired loan spread). At 1406, the real time pricing server 900 transmits to a user terminal 10 a profitability value associated with the additional mortgage loan via a communication network. For example, the real time pricing server 900 may calculate and transmit the profitability value in accordance with a contribution of the additional mortgage loan to the portfolio. Note that this calculation may not need to be an iterative process.

The present invention has been described in terms of several embodiments solely for the purpose of illustration. Persons skilled in the art will recognize from this description that the invention is not limited to the embodiments described, but may be practiced with modifications and alterations limited only by the spirit and scope of the appended claims.